

Section II (Remarks)

Request for One-Month Extension of Time Under 35 C.F.R. §1.136(a)

Applicants hereby request a one-month extension of time under 37 C.F.R. 1.136(a), thus extending the time for responding to the November 1, 2004 Office Action to March 1, 2005.

The Office is hereby authorized to charge the \$120.00 fee to the credit card specified in the Credit Card Payment Form enclosed herewith.

Response to Rejections of Claims 30-32, 35-45, and 71-74

In the November 1, 2004 Office Action, the Examiner finalized the rejections of previously allowed claims 30-32, 35-45, and 71-74. Specifically, the Examiner rejected:

Claims 30-32, 35-45 and 71-74 under 35 U.S.C. §102(e) as being anticipated by DiMeo, Jr. et al. U.S. Patent No. 6,265,222 (hereinafter "DiMeo"); and

Claims 31 and 35-44 under 35 U.S.C. §103(a) as being obvious over DiMeo in view of Ito et al. U.S. Patent No. 4,661,320 (hereinafter "Ito").

In response, Applicants have hereby amended claim 30, from which the remaining pending claims 31-32, 35-45, and 71-74 depend, to recite:

"A hydrogen gas detector, comprising:

a light source;

a thermal energy source that is separate from the light source;

an optical filter having an optical transmissivity responsive to the presence and concentration of hydrogen gas in an ambient environment to which the optical filter is exposed, said optical filter being disposed in proximity to the light source such that said optical filter is illuminated with light from the light source, and being operatively coupled to the thermal source such that the optical filter is heated by the thermal source to an elevated temperature;

a light detector generating an output signal, the state of said output signal being proportional to the intensity of light impinging on the light detector, said light detector being disposed in light-sensing relationship to the optical filter,

wherein the light source, the optical filter and the light detector are constructed and arranged so that light from the light source passing through the optical filter impinges on the light detector and generates said output signal as a indication of the presence and/or concentration of hydrogen gas in the ambient environment."

It is clear that Applicants' claimed invention as recited by amended claims 30-32, 35-45, and 71-74 requires a specific arrangement of the light source, the optical filter, and the light detector in which "light from the light source passing through the optical filter impinges on the light detector."

Nothing in DiMeo expressly discloses such specific light-detection arrangement that allows light from a light source to pass through an optical filter and impinge on a light detector.

In the November 1, 2004 Office Action, the Examiner pointed to teachings by the DiMeo reference at columns 2 and 7, which relate to detectable change in physical properties such as, inter alia, optical transmissivity in the hydrogen-interactive thin film in the presence of hydrogen and monitoring of such change by appropriate detector, and asserted that:

"Thus, it is *inherent* that light from a light source or ambient light passed through the optical filter and detected by detector" (see Office Action, page 5, lines 6-13).

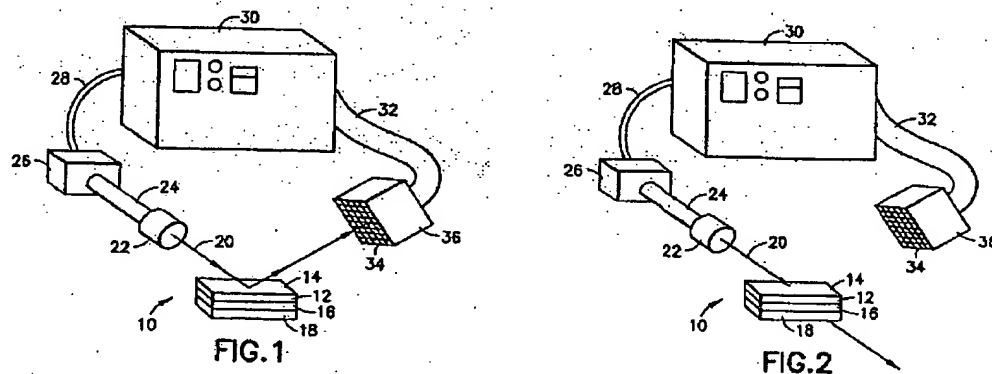
Applicants respectfully disagree.

It has been well established that inherency may not be established by probabilities or possibilities, and the mere fact that a certain thing may result from a given set of circumstances is not sufficient to establish inherency. *Scaltech, Inc. v. Retec/Tetra, LLC*, 51 USPQ2d 1055 (Fed. Cir. 1999). To establish inherency, the Office must provide evidence to show that "the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill." *In re Robertson*, 49 USPQ2d 1949 (Fed. Cir. 1999), quoting *Continental Can Co. v. Monsanto Co.*, 20 USPQ2d 1746 (Fed. Cir. 1991).

In this case, the specific light-detection arrangement for passing light from a light source through an optical filter to impinge on a light detector is neither required for detection of the change in optical transmissivity in the hydrogen-interactive thin film disclosed by DiMeo nor necessarily presented in the structures described by DiMeo.

Similar to the DiMeo reference, Bhandari et al. U.S. Patent No. 6,006,682 issued on December 28, 1999 (hereinafter "Bhandari") discloses the detectable change in the optical transmissivity of the rare earth metal film in response to the presence of hydrogen (see Bhandari, column 4, lines 60-67 and column 5, lines 1-36). Further, Bhandari teaches that such change in the optical transmissivity can be detected by impinging a light beam 20 from a light source 26 onto a hydrogen sensor 20 that contains a rare earth metal thin film 16 and monitoring light reflection from the hydrogen sensor 20 using a detector 34 placed on the same side as the light source 26, i.e., reflection of the light beam 20 by the sensor 20 and detection by the detector 34 indicates that hydrogen gas is absent, and absence of such reflection and non-detection by the detector 34 indicates that hydrogen gas is present (see Bhandari, Figures 1 and 2, and column 15, lines 7-58).

Figures 1 and 2 of the Bhandari reference are reproduced below for ease of reference:



The Bhandari reference clearly establishes that the specific light-detection arrangement, in which light from a light source is passed through the hydrogen-interactive thin film to impinge on the light detector, is neither required nor necessary for detection of the change in optical transmissivity in the hydrogen-interactive thin film disclosed by the DiMeo reference.

Instead, such detection can be readily achieved by using the hydrogen-interactive thin film 16 as a reflector, for reflecting light from the light source 26 onto the light detector 34 in the absence of hydrogen, and light that passes through such hydrogen-interactive thin film 16 in the presence of hydrogen is neither impinged on nor detected by the light detector 34.

Therefore, it is clear that mere teaching by the DiMeo reference about detection of change in optical transmissivity in the hydrogen-interactive thin film does not establish inherency of the specific light-detection arrangement as expressly required by claims 30-32, 35-45, and 71-74 of the present application.

More importantly, the DiMeo reference in fact teaches away from such specific light-detection arrangement, by forming the hydrogen sensor layer 26 (i.e., the potential optical filter) *directly on top of* a micro-hotplate structure.

The micro-hotplate structure disclosed by DiMeo reference comprises multiple structural layers including: (1) silicon dioxide layer 24, (2) aluminum contact pads 22, (3) silicon dioxide insulating layer 20, (4) conductive heat distribution plate 18, (5) silicon dioxide insulating layer 16, (6) polycrystalline silicon heating element 14, (7) silicon dioxide microbridge 12, and (8) silicon substrate 8 (see DiMeo reference, column 14, lines 27-67; column 15, lines 1-15; and Figures 2 and 3).

Light that passes through the hydrogen sensor layer 26 (i.e., the potential optical filter) will be immediately absorbed by such structural layers (1)-(8) of the micro-hotplate structure and therefore cannot impinge on a light detector to be detected. In other words, the specific light-detection arrangement required by claims 30-32, 35-45, and 71-74 of the present application, if ever implemented in the DiMeo structure, would have rendered such structure inoperable for the light-detection purpose.

A person ordinarily skilled in the art will choose to use the reflection-based light-detection arrangement disclosed by Bhandari in the structure disclosed by DiMeo, not the light-detection arrangement required by Applicant's claimed invention in light of the inoperability.

Therefore, any attempt to combine the DiMeo reference with additional secondary references, including the Ito reference, for the purpose of yielding Applicants' claimed invention is improper and cannot be used to establish a prima facie case of obviousness against the present invention.

Based on the foregoing, Applicants' claimed invention as recited by claims 30-32, 35-45, and 71-74 patentably distinguishes over the DiMeo reference, by requiring a specific light-

detection arrangement in which light from the light source passes through an optical filter and impinges on an light detector.

Applicants respectfully request the Examiner to reconsider, and upon reconsideration to withdraw, the rejections of claims 30-32, 35-45, and 71-74.

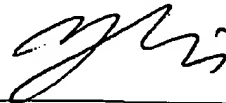
CONCLUSION

In view of all the foregoing, claims 30-32, 35-45, and 71-74 are in form and condition for allowance. Issue of a Notice of Allowance therefore is respectfully requested.

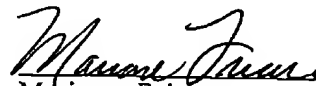
The United States Patent and Trademark Office is hereby authorized to charge any additional fee that is necessary for entry of this Amendment to Deposit Account No. 08-3284 of Intellectual Property/Technology Law.

If any issues remain outstanding, the Examiner is requested to contact the undersigned at (919) 419-9350 to discuss their resolution, and expedite closure of prosecution on the merits in favor of allowance of claims 30-32, 35-45, and 71-74.

Respectfully submitted,



Yongzhi Yang
Registration No. 56,310
Attorney for Applicants



Marianne Fuierer
Registration No. 39,983
Attorney for Applicants

Intellectual Property/Technology Law
P.O. Box 14329
Research Triangle Park, NC 27709
(919) 419-9354
Attorney File: 4249-401